

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant:	CIOFFI <i>et al.</i>	Examiner:	Dmitry Levitan
Serial No.:	10/692,297	Group Art Unit:	2616
Filed:	October 23, 2003	Docket No.:	STFD.060PA (S02-085)
Title:	CONCURRENT FREQUENCY-SHARING MULTI-USER COMMUNICATION SYSTEM WITH RATE ALLOCATION APPROACH		

APPEAL BRIEF

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P.O. Box 1450
Alexandria, VA 22313-1450

Customer No. 40581

Dear Sir:

This Appeal Brief is submitted pursuant to 37 C.F.R. §41.37, in support of the Notice of Appeal filed January 11, 2008, and in response to the rejections of claims 1-25 as set forth in the Final Office Action dated October 11, 2007

Please charge Deposit Account No. 50-0996 \$250.00 (STFD.060PA) for the small-entity fee for filing this brief in support of an appeal as set forth in 37 C.F.R. §1.17(c). If necessary, authority is given to charge/credit Deposit Account 50-0996 (STFD.060PA) additional fees/overages in support of this filing.

A Petition for Two-month Extension of Time is also attached. **Please charge Deposit Account No. 50-0996 \$230.00** (STFD.060PA) for the small-entity fee.

1. Real Party In Interest

The real party in interest is The Board of Trustees of the Leland Stanford Junior University, having a principal place of business at 1705 El Camino Real, Palo Alto, CA 94306-1106. The above-referenced patent application is assigned to The Board of Trustees of the Leland Stanford Junior University.

2. Related Appeals and Interferences

While Appellant is aware of other pending applications owned by the above-identified Assignee, Appellant is unaware of any related appeals, interferences or judicial proceedings that would have a bearing on the Board's decision in the instant appeal.

3. Status of Claims

Claims 1-25 stand rejected and are presented for appeal. A complete listing of the claims under appeal is provided in an Appendix to this Brief.

4. Status of Amendments

In accordance with the Advisory Action dated December 19, 2007, the amendments submitted in the Appellant's Response, dated December 10, 2007 and after the Final Office Action, have not been entered.

5. Summary of Claimed Subject Matter

Appellant's recited invention relates to a communication system that controls transmission rates for multiple users of the system.

Commensurate with independent claim 1, an example embodiment of the present invention is directed to a method for allocating user transmission rates in a communication system (FIG. 1, element 100 and page 7, line 28 to page 8 line 25) that is adapted to permit the users (FIG. 1, elements 110, 112 and page 7, line 28 to page 8 line 25) to transmit data simultaneously via shared frequency and spatial resources. The method includes maintaining the transmission rates of the users to at least a minimum user transmission rate (page 7, line 28 to page 8, line 25) to provide an expected minimum quality of communication for each of the users, incrementally adjusting the

transmission rates of the users by iteratively changing the transmission rate of each user (page 8, line 26 to page 9, line 9) as a function of a resulting vector of transmit powers ensuing from the incremental adjustment of the transmission rate, a degree of transmission-rate-allocation unfairness relative to the transmission rates of all the users, and a power-based selection criteria (page 10, line 25 to page 11, line 20).

Commensurate with independent claim 10, an example embodiment of the present invention is directed to a method for allocating transmission rates to multiple users (FIG. 1, elements 110, 112 and page 7, line 28 to page 8, line 25) in a communication system (FIG. 1, element 100 and page 7, line 28 to page 8, line 25) that is adapted to permit the users to transmit data simultaneously via shared frequency and spatial resources. The method includes setting the transmission rates of the users to at least a minimum user transmission rate to provide an expected minimum quality of communication for each of the users (page 7, line 28 to page 8, line 25) and then incrementally adjusting the transmission rates of the multiple users by iteratively increasing the transmission rates (page 8, line 26 to page 9, line 9) per the following steps: for each user, increasing its transmission rate without changing the transmission rate of the other users (page 11, line 21 to page 12, line 2), thereby providing a set of transmission rates that include a maximum user transmission rate and a minimum user transmission rate and, therefrom, determining a resulting vector of transmit powers ensuing from the increased transmission rate (page 11, lines 1-21), and a degree of transmission-rate-allocation unfairness as a function of a ratio of a maximum user transmission rate to a minimum user transmission rate (page 10, lines 13-24); from the resulting vector and the degree of transmission-rate-allocation unfairness, determining whether an increased one of the transmission rates for a corresponding one of the users satisfies a multi-user based selection criteria (page 10, lines 2-12) and, in response, increasing its transmission rate.

Commensurate with independent claim 20, an example embodiment of the present invention is directed to a communication system (FIG. 1, element 100 and page 7, line 28 to page 8, line 25) adapted to allocate transmission rates to multiple users (FIG. 1, elements 110, 112 and page 7, line 28 to page 8, line 25) and to permit the users to

transmit data simultaneously via shared frequency and spatial resources. The system includes means (FIG. 1, element 130 and page 8, lines 11-25) for maintaining the transmission rates of the users to at least a minimum user transmission rate to provide an expected minimum quality of communication for each of the users (page 7, line 28 to page 8, line 25); and means (FIG. 1, element 130, 110, 112 and page 8, lines 11-25), operative while maintaining the transmission rates of the users to at least a minimum user transmission rate, for incrementally adjusting the transmission rates of the users by iteratively changing the transmission rate of each user as a function of a resulting vector of transmit powers ensuing from the incremental adjustment of the transmission rate (page 11, lines 1-21), a degree of transmission-rate-allocation unfairness relative to the transmission rates of all the users (page 10, lines 13-24), and a power-based selection criteria (page 10, lines 2-12).

Commensurate with independent claim 21, an example embodiment of the present invention is directed to a communication system (FIG. 1, element 100 and page 7, line 28 to page 8, line 25) adapted to allocate transmission rates to multiple users (FIG. 1, elements 110, 112 and page 7, line 28 to page 8, line 25) and to permit the users to transmit data simultaneously via shared frequency and spatial resources. The system includes means (FIG. 1, element 130 and page 8, lines 11-25) for setting the transmission rates of the users to at least a minimum user transmission rate to provide an expected minimum quality of communication for each of the users (page 7, line 28 to page 8, line 25); and means (FIG. 1, element 130, 110, 112 and page 8, lines 11-25) for incrementally adjusting the transmission rates of the multiple users by iteratively increasing the transmission rates as follows: for each user, increasing its transmission rate without changing the transmission rate of the other users (page 11, line 21 to page 12, line 2), thereby providing a set of transmission rates that include a maximum user transmission rate and a minimum user transmission rate and, therefrom, determining a resulting vector of transmit powers ensuing from the increased incremental adjustment of the transmission rate (page 11, lines 1-21), and a degree of transmission-rate-allocation unfairness as a function of a ratio of a maximum user transmission rate to a minimum user transmission rate (page 10, lines 13-24); and from the resulting vector and the degree

of transmission-rate-allocation unfairness (page 10, lines 13-24), determining whether an increased one of the transmission rates for a corresponding one of the users satisfies a multi-user based selection criteria (page 10, lines 2-12) and, in response, increasing its transmission rate.

Commensurate with independent claim 25, an example embodiment of the present invention is directed to a data terminal (FIG. 1, element 130 and page 8, lines 11-25) for use in a communication system (FIG. 1, element 100 and page 7, line 28 to page 8, line 25) adapted to allocate transmission rates to multiple users (FIG. 1, elements 110, 112 and page 7, line 28 to page 8, line 25) and to permit the users to transmit data simultaneously via shared frequency and spatial resources. The data terminal includes a circuit that maintains a data transmission rate of the data terminal as a function of a minimum user transmission rate defined to provide an expected minimum quality of communication for each of the users (page 7, line 28 to page 8, line 25); and a data transmission rate adjustment circuit that incrementally adjusts the transmission rate of the data terminal as a function of a resulting vector of system-level transmit powers ensuing from the incremental adjustment of the transmission rate (page 11, lines 1-21), a degree of transmission-rate-allocation unfairness relative to the transmission rates of all the users (page 10, lines 13-24), and a system-level power-based selection criteria (page 10, lines 2-12).

As required by 37 C.F.R. § 41.37(c)(1)(v), a concise explanation of the subject matter defined in the independent claims involved in the appeal is provided herein. Appellant notes that representative subject matter is identified for these claims; however, the abundance of supporting subject matter in the application prohibits identifying all textual and diagrammatic references to each claimed recitation. Appellant thus submits that other application subject matter, which supports the claims, but is not specifically identified above, may be found elsewhere in the application. Appellant further notes that this summary does not provide an exhaustive or exclusive view of the present subject matter, and Appellant refers to the appended claims and their legal equivalents for a complete statement of the invention.

6. Grounds of Rejection to be Reviewed Upon Appeal

- 6.1. Claims 1-25 stand rejected under 35 U.S.C. § 112, first paragraph;
- 6.2. Claims 1-25 stand rejected under 35 U.S.C. § 112, second paragraph;
- 6.3. Claims 1, 3-4, 6-7, 10, 15-18, 20-21 and 23-25 stand rejected under 35 U.S.C. § 103(a) over Zehavi *et al.* (U.S. Patent No. 6,005,855);
- 6.4. Claims 5, 12, 14 and 22 stand rejected under 35 U.S.C. § 103(a) over Zehavi in further view of Admitted Prior Art; and
- 6.5. The drawings stand objected to under 37 C.F.R. § 1.84(p)(5).

7. Argument

Appellant respectfully submits that proper rejections under 35 U.S.C. § 112 and § 103 have not been presented after a thorough review of Appellant's specification as required, notwithstanding the difficulty of the technology. *See, e.g.*, M.P.E.P. § 2163 and § 2141. In the view of the record and Appellant's failed attempts to elicit further details regarding the Examiner's rationale to maintain the rejections, Appellant has been left with little recourse but to Appeal.

As will be discussed in more detail below, the Examiner's extensive use of Section 112(1) and Section 112(2) rejections primarily rely upon sweeping statements that portions of the disclosure are unclear or not understood by the Examiner. Appellant's efforts to assist the Examiner have included both explicit citations to Appellant's specifications and offers to provide further clarifications, should the Examiner be able to articulate that which the Examiner finds unclear. The Examiner has chosen not to respond thereto. As an example, the Examiner argues that there is "no information on generating a resulting vector of transmit power based on the increase (sic) transmission rate. The only vector mentioned in the cited portion of Appendix A is a standard interference vector, which is not a resulting vector of transmit powers." However, the Appendix (*see, e.g.*, Section IV) clearly discusses an iterative algorithm involving a power vector p . Moreover, there is no dispute that the Appendix teaches that an interference vector can be derived from the power vector. (*See, e.g.*, Appendix at page 6 "Let $i(p)$ be the resulting interference vector given the power allocation vector, p "). Such details are readily apparent from a cursory review of the Appendix.

In another erroneous statement, the Examiner argues that, "the disclosure provides no information on a clock-based circuit." Final Office Action of 10-11-2007 at page 4. However Appellant's specification expressly teaches the use of a central-processor unit (CPU), and CPUs are clock based-circuits. The Examiner, however, has maintained the rejection without explanation or factual evidence supporting the argument.

Another erroneous statement concerns the drawings:

"The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following information mentioned in the description: equal

rate allocation on Fig. 2, as disclosed on page 11, therefore the disclosed advantage of the proposed algorithm is not supported by Fig. 2.”
Final Office Action of 10-11-2007 at page 2.

This objection is unclear. The Examiner cites to a rule that does not provide any support for the Examiner’s contention that a “disclosed advantage” must be supported by a figure. In an abundance of caution, Appellant notes that various portions of the M.P.E.P. (*e.g.*, M.P.E.P. § 2145) discuss the relevance of disclosed advantages. With particular regard to M.P.E.P. § 2145, the Examiner’s discussion of a disclosed advantage is moot because Appellant has not relied upon this advantage in overcoming a rejection. Further, the alleged “disclosed advantage” relates to equal rate allocation. The record is clear that FIG. 2 shows degree of unfairness, which is taught to include rate allocations. Accordingly, the Examiner has neither clearly articulated how or why FIG. 2 should be amended nor clarified the relevance of the Examiner’s objection to allowability of the instance application.

Appellant notes that these and other misinterpretations by the Examiner appear to have extended into the rejections under 35 U.S.C. § 103(a), where the Examiner qualifies the rejections to be limited “as best understood” by the Examiner. To the extent the rejections rely upon such misinterpretations, Appellant can not attest to the Examiner’s personal understanding of the cited portions as the Examiner has chosen not to clarify that which the Examiner does not understand. Nor is Appellant able to further address, with any specificity, the Examiner’s as yet undisclosed rationale behind the conclusory statements that aspects are either “not understood” or “unclear” because little or no explanation is provided by the Examiner.

Moreover, in a specific instance, Appellant attempted to facilitate prosecution by proposing a minor amendment for antecedent basis, however, the Examiner has refused entry of the amendment without providing any rationale in support of the refusal.

Thus, Appellant respectfully submits that the Examiner has failed to provide sufficient evidential support for the various rejections and fails to address the substance of Appellant’s arguments. In view of the lack of evidence and analysis to support the Examiner’s assertions, Appellant submits that no material issue remains for many of the rejections. Appellant submits that while the Examiner has not indicated removal of such

rejections, the Examiner's failure to provide any factual evidence or specific arguments in support thereof borders on an implicit acquiescence to Appellant's positions.

7.1. 35 U.S.C § 112(1) Rejections of claims 1-25

Appellant respectfully traverses the Section 112(1) rejections of claims 1-25 because the Examiner has not provided sufficient analysis thereof. The claimed subject matter is described in the specification in such a way as to enable one of skill in the art to make and/or use the invention. M.P.E.P. § 2163 states that:

The examiner has the initial burden, after a thorough reading and evaluation of the content of the application, of presenting evidence or reasons why a person skilled in the art would not recognize that the written description of the invention provides support for the claims. There is a strong presumption that an adequate written description of the claimed invention is present in the specification as filed, *Wertheim*, 541 F.2d at 262, 191 USPQ at 96.

Appellant respectfully submits that the Examiner has not met the initial burden of a thorough reading and evaluation of the application and has presented neither sufficient evidence nor sufficient analysis/reasons why a person skilled in the art would not recognize that the written description of the invention provides support for the claims. Specifically, Appellant is to be afforded a strong presumption that an adequate written description of the claimed invention is present in the specification as filed. In some instances, the Examiner has not provided any such evidence/reason other than simply concluding that there is no support. In other instances, the Examiner's evidence/reasons rely upon false and/or illogical statements.

7.1.1. The 35 U.S.C § 112 (1) rejection of claims 1, 10, 20 and 21 Improperly Relies Upon Conclusory Statements Without Presenting Evidence Or Reasons For The Rejections And/Or Has Relied Upon Illogical Assertions

This issue is whether the claim limitations indicated by the Examiner have adequate support in the specification. The limitations in question include those directed to one or more of the following:

- 1) a vector of transmit powers;
- 2) a degree of transmission-rate-allocation unfairness relative; and
- 3) a power-based selection criteria.

The Examiner's rejections include paraphrases from the M.P.E.P. with little or no discussion of the relevant portions of Appellant's specification. Without supporting evidence and analysis, such statements amount to a mere conclusion that there is lack of support and are insufficient to overcome the strong presumption that should have been afforded to Appellant.

For example, the Examiner improperly concludes that "the specification does not provide sufficient details to enable a skilled in the art to make and use the invention because it does not adequately describe the following:". The Examiner next repeats Appellant's claim limitations with a conclusory statement that the claims are not adequately described. Such a cursory analysis is insufficient to overcome the strong presumption that should have been afforded to the Appellant. Moreover, a thorough review of Appellant's specification, including those citations provided by Appellant, would have revealed support for each aspect. Appellant's attempts to assist the Examiner were dismissed in part because Appellant "cited the portion of the disclosure, which has been indicated as unclear." A paragraph from which the cited portion was taken is reproduced below for convenience.

Mathematically, the system design problem can be represented as

$$\max(\sum_{i=1}^K Ri) \quad (2)$$

subject to:

$$\begin{aligned} p_i &\leq p_{i,\max} \\ \frac{\max(R_i)}{\min(R_j)} &\leq U \\ R_i &\leq R_{\min} \end{aligned} \quad (5)$$

where Ri is the rate for the i^{th} user, p_i is the transmit power for the i^{th} user and

$P_{i,max}$ is the maximum permissible transmit power for the i^{th} user. U is the degree of *unfairness* allowed by the system operator, and R_{min} is the minimum rate guaranteed to all the users.

Appellant's Specification at page 10.

Appellant submits that the above teachings provide clear support for the limitations directed to unfairness. With regard to a vector of transmit powers, Appellant's specification includes numerous discussion regarding the use of a power vector and of selection criteria (which includes power criteria). The following passage provides clear support for this; moreover, Appellant notes that further support of specific implementations can be found elsewhere in Appellant's specification.

According to a specific example embodiment, rate allocation is achieved using an algorithm described as follows:

Let ΔR be the smallest possible rate increment.

- Step 1: Set the rates of all the users to R_{min} .
- Step 2: For each user, k , increase its rate by ΔR without changing the rate of all the other users. Let U_k be the resulting *unfairness* of the rate allocation and U_k be the resulting vector of transmit powers. The resulting transmit power vector may be determined by the iterative algorithm as discussed in the appendix attached hereto (Avneesh Agrawal, John M. Cioffi, "Power Control for Multiuser Space-Time CDMA," *GLOBECOM 2002*).
- Step 3: Let S be the set of users such that $U_k \leq U$ and $p^{(k)} \leq P_{max}$, where $P_{max} = [p_{0,max}, p_{1,max}, \dots, p_{k-1,max}]$ is the vector of maximum permissible transmit powers. If the set S is empty, then the iteration is terminated.
- Step 4: If the set S is not empty, then from the set S , select the user that optimizes the selection criteria (as discussed above) and increase the rate of that user by ΔR . Then, go to Step 2.

Appellant's Specification at pages 10-11.

As should be apparent, the above passage provides support for each of the relevant limitations including unfairness of the rate allocation, resulting vector of transmit powers and power criteria. The above discussion also provides support for the use of such elements as it relates to rate allocation. The record is uncontroverted regarding such

teachings of Appellant's specification and their support for each of the aspects identified by the Examiner.

To the extent that the Examiner believes some portion is unclear, the record contains no explanation thereof. Specifically, Appellant respectfully submits that the Examiner has provided no explanation other than broad assertions, such as asserting that the Examiner is unable to understand Appellant's disclosure. Due to such a lack of any specific explanation as to what is not understood, Appellant is unable to ascertain the portions that the Examiner does not understand. Consistent with M.P.E.P. § 2163, the Examiner should have clarified with particularity how the teachings in Appellant's specification fail to adequately describe the claim limitations.

In an effort to develop a clear issue, the Appellant respectfully requested that the Examiner present evidence or reasons why a person skilled in the art would not understand Appellant's specification. Appellant further offered to explain any particular aspects identified by the Examiner as not understood. The Examiner chose not to respond in any substance. As such, there is nothing in the record to support the Examiner's mere conclusory statements. Without such support the Examiner has not met the initial burden of a rejection, which includes overcoming Appellant's strong presumption of adequate support in the initial filing. Moreover, there is nothing in the record to rebut the supporting evidence provided by Appellant. According, Appellant requests that the rejection be reversed.

7.1.2. The 35 U.S.C § 112 (1) Rejection of Claim 25 Relies Upon an Illogical and Unsupported Assertion.

Claim 25 includes an additional reason of rejection from claims 1, 10, 20 and 21. Thus, Appellant has separately argued the rejection of claim 25 under Section 112 (1). The first issue is whether the following claim limitations indicated by the Examiner have adequate support in the specification. Accordingly, Appellant reiterates the argument from the above section. The limitations in question include those directed to one or more of the following:

- 1) a vector of transmit powers;
- 2) a degree of transmission-rate-allocation unfairness relative; and
- 3) a power-based selection criteria.

The Examiner's rejections include paraphrases from the M.P.E.P. with little or no discussion of the relevant portions of Appellant's specification. Without supporting evidence and analysis, such statements amount to a mere conclusion that there is lack of support and are insufficient to overcome the strong presumption that should have been afforded to Appellant.

For example, the Examiner improperly concludes that "the specification does not provide sufficient details to enable a skilled in the art to make and use the invention because it does not adequately describe the following:". The Examiner next repeats Appellant's claim limitations with a conclusory statement that the claims are not adequately described. Such a cursory analysis is insufficient to overcome the strong presumption that should have been afforded to the Appellant. Moreover, a thorough review of Appellant's specification, including those citations provided by Appellant, would have revealed support for each aspect. Appellant's attempts to assist the Examiner were dismissed in part because Appellant "cited the portion of the disclosure, which has been indicated as unclear." A paragraph from which the cited portion was taken is reproduced below for convenience.

Mathematically, the system design problem can be represented as

$$\max\left(\sum_{i=1}^K R_i\right) \quad (2)$$

subject to:

$$\begin{aligned} p_i &\leq p_{i,\max} \\ \frac{\max(R_i)}{\min(R_j)} &\leq U \\ R_i &\leq R_{\min} \end{aligned} \quad (5)$$

where R_i is the rate for the i^{th} user, p_i is the transmit power for the i^{th} user and $P_{i,\max}$ is the maximum permissible transmit power for the i^{th} user. U is the degree of *unfairness* allowed by the system operator, and R_{\min} is the minimum rate guaranteed to all the users.

Appellant's Specification at page 10.

Appellant submits that the above teachings provide clear support for the limitations directed to unfairness. With regard to a vector of transmit powers, Appellant's specification includes numerous discussion regarding the use of a power vector and of selection criteria (which includes power criteria). The following passage provides clear support for this; moreover, Appellant notes that further support of specific implementations can be found elsewhere in Appellant's specification.

According to a specific example embodiment, rate allocation is achieved using an algorithm described as follows:

Let ΔR be the smallest possible rate increment.

- Step 1: Set the rates of all the users to R_{\min} .
- Step 2: For each user, k , increase its rate by ΔR without changing the rate of all the other users. Let U_k be the resulting *unfairness* of the rate allocation and U_k be the resulting vector of transmit powers. The resulting transmit power vector may be determined by the iterative algorithm as discussed in the appendix attached hereto (Avneesh Agrawal, John M. Cioffi, "Power Control for Multiuser Space-Time CDMA," *GLOBECOM 2002*).
- Step 3: Let S be the set of users such that $U_k \leq U$ and $p^{(k)} \leq P_{\max}$, where $P_{\max} = [p_{0,\max}, p_{1,\max}, \dots, p_{k-1,\max}]$ is the vector of maximum permissible transmit powers. If the set S is empty, then the iteration is terminated.

- Step 4: If the set S is not empty, then from the set S , select the user that optimizes the selection criteria (as discussed above) and increase the rate of that user by ΔR . Then, go to Step 2.

Appellant's Specification at pages 10-11.

As should be apparent, the above passage provides support for each of the relevant limitations including unfairness of the rate allocation, resulting vector of transmit powers and power criteria. The above discussion also provides support for the use of such elements as it relates to rate allocation. The record is uncontroverted regarding such teachings of Appellant's specification and their support for each of the aspects identified by the Examiner.

To the extent that the Examiner believes some portion is unclear, the record contains no explanation thereof. Specifically, Appellant respectfully submits that the Examiner has provided no explanation other than broad assertions, such as asserting that the Examiner is unable to understand Appellant's disclosure. Due to such a lack of any specific explanation as to what is not understood, Appellant is unable to ascertain the portions that the Examiner does not understand. Consistent with M.P.E.P. § 2163, the particularity of how the teachings in Appellant's specification fail to adequately describe the claim limitations should be clarified.

In addition the reasons discussed above in connection with claims 1, 10, 20 and 21 and their rejection under Section 112(1) the Examiner has erroneously asserted that a CPU is not an example of a clock-based circuit. The Examiner has merely presented a conclusory statement and has failed to provide any support for this assertion. Appellant submits that one of skill in the art would readily understand that CPUs are examples of clocked based circuits. Specifically a CPU is a type of circuit and many CPUs are sold based upon their respective clock speeds (*e.g.*, 300MHz Pentium III ®). The Examiner has chosen not to respond with any rationale or evidence to support the conclusory statement. Accordingly, Appellant respectfully submits that the Examiner's assertion is illogical and lacks proper support.

In an effort to develop a clear issue, the Appellant respectfully requested that the Examiner present evidence or reasons why a person skilled in the art would not

understand Appellant's specification. The Examiner's chose not to respond to this request. As such, there is nothing in the record to support the Examiner's conclusory statements. Without such support there the Examiner has not met the initial burden of the rejection. Moreover, there is nothing in the record to rebut the evidence provided by Appellant. For the aforementioned reasons, Appellant requests that the rejection be reversed.

7.2. The 35 U.S.C § 112(2) Rejection Of Claims 1-25 Are Improper Because There Is Not Sufficient Evidence In The Record To Support The Rejections And The Claims Do Particularly Point Out And Distinctly Claim That Which Appellant Regards As The Invention.

The Examiner has not provided adequate analysis as to why the (improperly) rejected terms are vague and indefinite. M.P.E.P. § 2173.02 states that:

If upon review of a claim in its entirety, the examiner concludes that a rejection under 35 U.S.C. 112, second paragraph, is appropriate, such a rejection should be made and an analysis as to why the phrase(s) used in the claim is "vague and indefinite" should be included in the Office action.

To the extent that the Examiner has provided analysis as to why the phrase(s) used in the claims is "vague and indefinite," such analysis is illogical and, in some cases, directly contradicted by the teachings of Appellant's specification. These aspects were pointed out in Appellant's response of December 10, 2007, to which the Examiner has chosen to provide no evidence or argument to the contrary. Accordingly, the Examiner's conclusory statements regarding the 112(2) rejections appear to be based upon a lack of thorough review and illogical misinterpretations of the relevant teachings.

In an effort to facilitate prosecution, Appellant previously provided the Examiner with citations to Appellant's specification that showed examples of the various elements erroneously identified as indefinite. In response, the Examiner merely concludes that these limitations are unclear because the Examiner does not understand the Appellant's Specification. Without further explanation as to what portion of the limitations the

Examiner is unable to understand, Appellant is unable to ascertain the Examiner's point of confusion. The following discussion addresses specific shortcomings of the Examiner's rejections.

7.2.1. The 35 U.S.C § 112(2) Rejection Of Claims 1-25 Are Improper for lack of Sufficient Rationale For The Conclusory Statement Regarding The Limitations Directed To A Resulting Vector Of Transmit Powers Ensuing The Increased Transmission Rate

Appellant is unable to determine what the Examiner believes is indefinite about the language at issue. The Examiner's argument is essentially a recitation of the limitation and a conclusory statement that the language is not understood. Appellant submits that without the evidence or reasons for the rejection, the rejection is improper because the claim language is definite in view of the plain meaning of the terms (*i.e.*, independent of any explanation in Appellant's specification).

The claim language is directed to a resulting vector of transmit powers that ensues the increased transmission rate. The Examiner identifies the problematic terms as "resulting vector of transmit powers." Appellant submits that these terms would be understood by a person of skill in the art. For example, a person of skill in the art would understand that "resulting" means to come about as a consequence; "vector" is a mathematical-based structure; "transmit" means to send; and "powers" means energies. The Examiner has provided no explanation as to why these conventional terms would not be understood by the skilled artisan. Absent any evidence or explanation in the record to support indefiniteness, the rejected claim language is definite without need for further explanation.

Notwithstanding, Appellant previously attempted to assist the Examiner's understanding by providing citations to Appellant's specification. These citations taught example implementations that were consistent with the claim limitations. Appellant respectfully disagrees with the Examiner's unsupported conclusion that the disclosure is unclear; however, as each of these terms has a plain meaning to those of skill in the art, the Examiner's assertion regarding allegedly unclear portions of the specification is moot.

Accordingly, the Examiner's rejection is improper for failure to provide any explanation other than a conclusory statement related to the Examiner's inability to understand the specification and/or relevant claim terms. The Examiner has chosen not to provide a specific explanation of the rationale for the rejection, including an explanation of why the terms would not be understood by one of skill in the art. Accordingly, the record does not contain sufficient support for the rejections and Appellant requests that the rejections be reversed.

7.2.2. The 35 U.S.C § 112(2) Rejection Of Claim 4 Improperly Requires Explicit Antecedent Basis For An Inherent Element

The Examiner has erroneously rejected claim 4 under 112(2) for lack of antecedent basis as related to the term "all users." Explicit antecedent basis is not required in a claim. *See, e.g.,* M.P.E.P. § 2173.05(e). Appellant respectfully submits that given the term "all users" (from claim 1) there is necessarily a set of all users, and as such, the Examiner's assertion appears to improperly require explicit antecedent basis for a claim term that is an inherent element of a previous claim term.

Moreover, the Examiner's assertion that the set of all users can be directed to less than all users is irrelevant. Even assuming this to be true, the mere fact that two possible embodiments are covered by a claim would not render the claim indefinite. Accordingly, Appellant submits the claim is definite. Notwithstanding, Appellant amended claim 4 in an attempt to facilitate prosecution. The amendment was not intended to change the scope of the claims and rendered the rejection moot. The Examiner, however, did not enter the amendment and provided no reason in support of the denial. For the aforementioned reasons, Appellant requests that the rejection be reversed.

7.2.3. The 35 U.S.C § 112(2) Rejection Of Claim 4 Lacks A Proper Analysis Of Limitations Directed To The Corresponding Iteration

The Examiner asserts that the claim is invalid for lack of antecedent basis. The Examiner has concluded that "the corresponding iteration' fails to identify the particular iteration of the claim due to lack of proper antecedent basis." Final Office Action of

October 11, 2007 at page 11. No further rationale is given for this assertion and the Examiner chose not respond to Appellant's previous response.

Claim 4 includes limitations directed to identification of a user and to use of the corresponding iteration. Claim 1 includes limitations directed to iteratively changing the transmission rate of each user. Thus, claim 1 provides explicit antecedent basis for iterations corresponding to a change in transmission rate of each user. The Examiner chose not to respond in substance to this uncontroverted argument. Accordingly, the rejection is improper and Appellant requests that it be reversed.

7.2.4. The 35 U.S.C § 112(2) Rejection Of Claims 1 and 20 Improperly Relies Upon The Breadth Of The Limitations

The Examiner asserts that it is not understood if the claimed degree is one value of unfairness for each user or a set of unfairness values for all users. Appellant notes that the Examiner's rejection is improper as it is impermissibly attempting to limit the breadth of the limitations. (*See* M.P.E.P. § 2173.04: "Breadth of a claim is not to be equated with indefiniteness. *In re Miller*, 441 F.2d 689.") In this instance, the Examiner is merely asserting that there are two possible embodiments that could be covered by the limitations in question. Each of the two possible interpretations has a clear a definite scope. Accordingly, the Examiner's has only asserted that the claims might cover more than a single embodiment. Such a showing is not a sufficient basis for the rejection. The case law and M.P.E.P. are clear that a showing of the breadth of the claim does not equate to a showing of indefiniteness. Thus, the record is silent as to any reason that the interpretations are not definite. The Examiner has chosen not to respond in substance to this uncontroverted argument. Accordingly, the rejection is improper and Appellant requests that it be reversed.

7.3. 35 U.S.C. § 103(b) Rejections of claims 1, 3-7, 10, 12, 14-18, 20-25

Appellant respectfully traverses the Section 103(a) rejections for the reasons presented below. Each rejection relies upon the same underlying Zehavi reference. Appellant respectfully submits that the Zehavi reference is largely unrelated to the claimed invention.

7.3.1. Claims 1, 3-7, 10, 12, 14-18, 20-25: The Examiner Has Failed To View The Claimed Invention And Cited References As A Whole

The Examiner has cited to various elements of the Zehavi reference without properly viewing, as a whole, the teachings of the Zehavi reference and the claim limitations. M.P.E.P. § 2141 states that following tenets of patent law must be adhered to: 1) the claimed invention must be considered as a whole and 2) the references must be considered as a whole. This section also states that when determining the scope and content of the prior art, Office personnel must first obtain a thorough understanding of the invention disclosed and claimed in the application under examination by reading the specification, including the claims, to understand what the Appellant has invented. *See* also MPEP § 904.

Thus, a proper rejection does not rely only upon the identification of individual elements without an analysis of how the elements are related both in the claimed invention and the relied upon references. Moreover, the Examiner should make every attempt to obtain a thorough understanding of the invention disclosed and claimed in the application. Here, the Examiner has not performed the necessary “as a whole analysis” while attempting to address various limitations as further detailed in the following specific examples.

7.3.1.1. The Examiner Has Failed To Properly Address How The Power Control Groups Relate To Limitations Directed To Changing The Transmission Rate Of Each User

The Examiner erroneously relies upon the teachings related to the ordering of power control groups. The Examiner has not provided any explanation as to how the ordering of power control groups is related to iterative changes to a user's transmission rate. Appellant respectfully submits that the relied upon portion of the Zehavi reference is related to the order of transmission (*i.e.*, for the purpose of data recovery using duplicative transmissions), and thus, is not relevant to the claim limitations as a whole, which are directed to iterative changes to users' transmission rates based upon various factors that are not specifically addressed by the Examiner. Thus, the Examiner has not connected the dots between the individual elements and in doing so fails to view Appellant's claims as a whole

With particular regard to the limitations directed to a resulting vector of transmit powers ensuing from the increased transmission rate, the Examiner has failed to provide adequate analysis of how the Zehavi reference teaches correspondence. The cited portion does not provide any discussion of a vector of transmit powers or the use of such a vector in relation to changes in a users' transmission rate. The Examiner appears to assert that knowledge of vectors generally, is proper basis to show correspondence for any use of a vector. The assertion fails to view the claim limitations as a whole. Specifically, the Examiner does not show how the power control groups are relevant to such vectors nor shed light on their use. For at least the aforementioned reasons, Appellant submits that the relied upon portion of the Zehavi reference does not appear to correspond to the limitations and that the rejections should be reversed.

7.3.1.2. The Overflow Channels Are Not Taught To Be Relative To The Transmission Rates Of All Users

In another example, the Examiner erroneously relies upon the use of overflow channels to correspond to the limitations directed to a degree of transmission rate

allocation unfairness relative to the transmission rates of all users. The Examiner improperly asserts that overflow rate assignment is inherently directed to unfairness because both factors are interrelated. Consistent with M.P.E.P. § 2112, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. Merely asserting that two factors are interrelated does not establish inherency without an explanation of why the inherent aspect is a necessary component in the teachings. Accordingly, the Examiner has merely concluded that there is a relationship while failing to show this relationship. Appellant is not aware of any teachings that have been identified to correspond to a degree of transmission rate allocation unfairness. Instead, the “fairness” discussed in connection with the Zehavi reference is relative to the number traffic channels assigned to each overflow channel and the number of joint assignment of each pair of overhead channels. *See, e.g.*, Zehavi at Col. 22, lines 25-30. This “fairness” is not taught to be relative to the actual transmission rates of the users. Thus, the relied upon portion of the Zehavi reference is unrelated to a transmission rate allocation fairness that is relative to the transmission rates of all users. As Examiner has chosen not to provide evidence to the contrary, the rejection is improper and should be reversed. In view of the above, the rejections are improper and Appellant requests that they be reversed.

7.3.1.3. The Cited Portions Of Zehavi Do Not Correspond To Claim Limitations Directed To Incrementally Adjusting The Transmission Rates Of The Users By Iteratively Changing The Transmission Rate Of Each User

The Zehavi reference is generally directed to assigning overflow channels to a user when the rate of the user’s transmission exceeds the capacity of their allocated traffic channel, if an overflow channel is available. *See, e.g.*, Col. 2:66 to Col. 3:25. The cited portions of Zehavi do not teach changing the transmission rates of the users relative to each other, but simply teach assigning overflow channels based on the user’s transmission rate and the availability of the overflow channels. Thus, the cited portions

of Zehavi do not teach iteratively changing the transmission rates of each user. As Examiner has provided no further evidence to the contrary, the rejection is improper.

Accordingly, the Section 103(a) rejections are improper and Appellant requests that they be reversed.

7.3.2. The Examiner's Use Of Official Notice Is Improper For Failing To Provide Support For The Specific Implementation The Examiner Is Relying Upon And For Relying Upon Improper Conclusory Statements

Appellant traversed the Examiner's taking of Official Notice "that combining a set of values in a vector is well known in the art," with respect to the particular application being asserted. According to M.P.E.P. § 2144.03 "It would not be appropriate for the examiner to take official notice of facts without citing a prior art reference where the facts asserted to be well known are not capable of instant and unquestionable demonstration as being well-known." Appellant submits that without a citation to a prior art reference in support, the Examiner's use of Official Notice in this instance is improper.

The Examiner's only support for this hypothetical combination is a general discussion of a vector found in an IEEE standard for wireless broadcasts; however, the Examiner's combination allegedly involves "combining transmit powers into a vector to the system of Zehavi to improve the system analysis by utilizing a well known vector presentation of the transmit powers for mathematical operations to optimize the system." Neither reference is alleged to teach these aspects, nor does the Examiner provide any explanation of what the various components actually comprise, how they would be implemented, or how they would function. Merely identifying a vector in the abstract is insufficient to show correspondence to a specific use of a vector. Thus, the Examiner has not presented a *prima facie* case of obviousness as the rejection relies upon vague and unsupported conclusory statements. Moreover, Appellant's specification provides the only source of teachings in the record that correspond to the Examiner's hypothetical combination. As such, the Examiner appears to have relied upon impermissible hindsight reconstruction.

7.3.3. There Is No Reason To Combine The Elements Used In The Rejection.

The Office Action has not provided a valid reason to combine the allegedly well known aspects with the Zehavi reference. This approach is contrary to the requirements of 37 U.S.C. § 103 and relevant law. “A patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art.” *KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (U.S. 2007). In this instance, the Office Action simply concludes that it would be obvious to add combining transit powers into a vector to the system of Zehavi “to improve the system analysis.” *See, e.g.*, page 6 of the Office Action. However, the Examiner has not provided evidence as to why one of skill in the art would have found the asserted combination obvious for this reason. The Examiner also fails to analyze how the proposed modification would improve system analysis. Instead, the Examiner improperly relied upon conclusory statements of an advantage without providing any evidence in support thereof.

Moreover, Appellant submits that such a generic combination would frustrate the intended purpose and operation of the Zehavi reference. According to M.P.E.P. § 2143.01, if a “proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.” *See In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984). More specifically, the generic combination of seemingly unrelated elements in an undefined manner would not function properly. For instance, the record is silent as to any teachings (other than Appellant’s specification) that would allow the various elements to be combined in a meaningful manner. In view of the above, the 35 U.S.C. § 103(a) rejections are improper and Appellant requests that they be reversed.

7.4. The Objection To The Drawings Under 37 C.F.R. § 1.84(P)(5) Are Improper And Illogical.

In an abundance of caution, Appellant submits that the Examiner’s objection has not been shown to have relevance to the various rejections herein.

As previously stated, the Examiner cites to a rule that does not provide any support for the Examiner’s contention that a “disclosed advantage” must be supported by a figure.

As a precautionary measure, Appellant notes that with particular regard to M.P.E.P. § 2145, the Examiner's discussion of a disclosed advantage is moot because Appellant has not relied upon this advantage in overcoming a rejection. Moreover, the alleged "disclosed advantage" relates to equal rate allocation. The record is clear that FIG. 2 shows degree of unfairness, which is taught to include rate allocations. Accordingly, the Examiner has not clearly articulated how or why FIG. 2 should be amended nor has the Examiner clarified the relevance of the Examiner's objection to the allowability of the instance application. As such, Appellant submits that the Examiner has chosen not respond to Appellant's arguments, that the objections are not relevant to the rejections under 35 U.S.C. § 112 or § 103, and further that the Examiner's request for modification is illogical. Due to the erroneous basis of the objection, Appellant has not been afforded a proper opportunity to correct any alleged deficiency. More specifically, the alleged deficiency is already present in the figure.

8. Conclusion

In view of the above, Appellant submits that the rejections of claims 1-25 are improper. Appellant therefore requests reversal of the rejections as applied to the appealed claims and allowance of the entire application.

Authority to charge the undersigned's deposit account was provided on the first page of this brief.

Respectfully Submitted,

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(STFD.060PA)

APPENDIX OF CLAIMS INVOLVED IN THE APPEAL
(S/N 10/692,297)

1. A method for allocating user transmission rates in a communication system that is adapted to permit the users to transmit data simultaneously via shared frequency and spatial resources, the method comprising:

while maintaining the transmission rates of the users to at least a minimum user transmission rate to provide an expected minimum quality of communication for each of the users, incrementally adjusting the transmission rates of the users by iteratively changing the transmission rate of each user as a function of

a resulting vector of transmit powers ensuing from the incremental adjustment of the transmission rate,

a degree of transmission-rate-allocation unfairness relative to the transmission rates of all the users, and

a power-based selection criteria.

2. The method of claim 1, wherein the degree of transmission-rate-allocation unfairness is a function of a ratio of a maximum user transmission rate to a minimum user transmission rate.

3. The method of claim 1, further including using the resulting vector and the degree of transmission-rate-allocation unfairness to identify a user for the corresponding iteration and, therefrom, increasing its transmission rates in a next iteration.

4. The method of claim 1, further including using the resulting vector and the degree of transmission-rate-allocation unfairness to identify a user from the set of all users, that optimizes the selection criteria for the corresponding iteration and, therefrom, increasing its transmission rates in a next iteration.

5. The method of claim 1, wherein the system is an OFDM (orthogonal-frequency-division-multiplex) communication system and further including transmitting the data from the users using OFDM communication.
6. The method of claim 1, wherein the system is a CDMA (code-division-multiple-access) communication system and further including transmitting the data from the users using CDMA communication.
7. The method of claim 1, further including setting the transmission rates of the users to the minimum user transmission rate before incrementally adjusting the transmission rates of the users.
8. The method of claim 1, wherein iteratively changing the transmission rate of each user includes iteratively changing the transmission rate by a constant.
9. The method of claim 1, wherein the power-based selection criteria is selected from the set of: minimization of average transmit power; minimization of maximum transmit power; and minimization of total received power.
10. A method for allocating transmission rates to multiple users in a communication system that is adapted to permit the users to transmit data simultaneously via shared frequency and spatial resources, the method comprising:
 - (a) setting the transmission rates of the users to at least a minimum user transmission rate to provide an expected minimum quality of communication for each of the users and then incrementally adjusting the transmission rates of the multiple users by iteratively increasing the transmission rates per the following steps:
 - (b) for each user, increasing its transmission rate without changing the transmission rate of the other users, thereby providing a set of transmission rates that include a maximum user transmission rate and a minimum user transmission rate and, therefrom, determining

a resulting vector of transmit powers ensuing from the increased transmission rate, and

a degree of transmission-rate-allocation unfairness as a function of a ratio of a maximum user transmission rate to a minimum user transmission rate;

(c) from the resulting vector and the degree of transmission-rate-allocation unfairness, determining whether an increased one of the transmission rates for a corresponding one of the users satisfies a multi-user based selection criteria and, in response, increasing its transmission rate.

11. The method of claim 10, wherein the multi-user based selection criteria includes a power-based selection criteria, and further including, after step (c), repeating steps (b) and (c) until an iteration in which none of the transmission rates satisfies the power-based selection criteria and satisfies the degree of transmission-rate-allocation unfairness.

12. The method of claim 10, wherein the system is an OFDM (orthogonal-frequency-division-multiplex) communication system and further including transmitting the data from the users using OFDM communication.

13. The method of claim 12, wherein the multi-user based selection criteria includes a power-based selection criteria, and further including, after step (c), repeating steps (b) and (c) until an iteration in which none of the transmission rates satisfies the power-based selection criteria and satisfies the degree of transmission-rate-allocation unfairness.

14. The method of claim 10, wherein the system is an OFDM (orthogonal-frequency-division-multiplex) communication system permitting the users to transmit the data on multiple frequencies and further including transmitting the data from the users using OFDM communication.

15. The method of claim 10, wherein the system is a CDMA (code-division-multiple-access) communication system and further including transmitting the data from the users using CDMA communication.

16. The method of claim 15, wherein the multi-user based selection criteria includes a power-based selection criteria, and further including, after step (c), repeating steps (b) and (c) until an iteration in which none of the transmission rates satisfies the power-based selection criteria and satisfies the degree of transmission-rate-allocation unfairness.

17. The method of claim 10, further including, after step (c), repeating steps (b) and (c) until an iteration in which none of the transmission rates satisfies the degree of transmission-rate-allocation unfairness.

18. The method of claim 10, further including, after step (c), repeating steps (b) and (c) until an iteration in which none of the transmission rates satisfies the multi-user based selection criteria.

19. The method of claim 10, further including, after step (c), repeating steps (b) and (c) until an iteration in which none of the transmission rates satisfies the multi-user based selection criteria and, thereafter, attempting to optimize system operation.

20. A communication system adapted to allocate transmission rates to multiple users and to permit the users to transmit data simultaneously via shared frequency and spatial resources, the system comprising:

means for maintaining the transmission rates of the users to at least a minimum user transmission rate to provide an expected minimum quality of communication for each of the users; and

means, operative while maintaining the transmission rates of the users to at least a minimum user transmission rate, for incrementally adjusting the transmission rates of the users by iteratively changing the transmission rate of each user as a function of

- a resulting vector of transmit powers ensuing from the incremental adjustment of the transmission rate,
- a degree of transmission-rate-allocation unfairness relative to the transmission rates of all the users, and
- a power-based selection criteria.

21. A communication system adapted to allocate transmission rates to multiple users and to permit the users to transmit data simultaneously via shared frequency and spatial resources, the system comprising:

- means for setting the transmission rates of the users to at least a minimum user transmission rate to provide an expected minimum quality of communication for each of the users; and

- means for incrementally adjusting the transmission rates of the multiple users by iteratively increasing the transmission rates as follows:

- for each user, increasing its transmission rate without changing the transmission rate of the other users, thereby providing a set of transmission rates that include a maximum user transmission rate and a minimum user transmission rate and, therefrom, determining

- a resulting vector of transmit powers ensuing from the increased incremental adjustment of the transmission rate, and

- a degree of transmission-rate-allocation unfairness as a function of a ratio of a maximum user transmission rate to a minimum user transmission rate; and
 - from the resulting vector and the degree of transmission-rate-allocation unfairness, determining whether an increased one of the transmission rates for a corresponding one of the users satisfies a multi-user based selection criteria and, in response, increasing its transmission rate.

22. The system of claim 21, wherein the system is an OFDM (orthogonal-frequency-division-multiplex) communication system permitting the users to transmit the data on

multiple frequencies and further including transmitting the data from the users using OFDM communication.

23. The method of claim 21, wherein the system is a CDMA (code-division-multiple-access) communication system and further including transmitting the data from the users using CDMA communication.

24. The method of claim 21, wherein the system is a CDMA (code-division-multiple-access) cellular communication system and wherein the rate allocation is provided to multiple users communicating with a common base station for the cellular communication system, and further including transmitting the data from the users to common base station using CDMA communication.

25. For use in a communication system adapted to allocate transmission rates to multiple users and to permit the users to transmit data simultaneously via shared frequency and spatial resources, a data terminal comprising:

- a circuit that maintains a data transmission rate of the data terminal as a function of a minimum user transmission rate defined to provide an expected minimum quality of communication for each of the users; and

- a data transmission rate adjustment circuit that incrementally adjusts the transmission rate of the data terminal as a function of

- a resulting vector of system-level transmit powers ensuing from the incremental adjustment of the transmission rate,

- a degree of transmission-rate-allocation unfairness relative to the transmission rates of all the users, and

- a system-level power-based selection criteria.

APPENDIX OF EVIDENCE

Appellant is unaware of any evidence submitted in this application pursuant to 37 C.F.R. §§ 1.130, 1.131, and 1.132.

APPENDIX OF RELATED PROCEEDINGS

As stated in Section II above, Appellant is unaware of any related appeals, interferences or judicial proceedings.